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MIL-M-15071F(SHIPS)  
 28 August 1967  
 SUPERSEDING  
 MIL-M-15071E(SHIPS)  
 15 April 1962  
 (See 6.6)

## MILITARY SPECIFICATION

## MANUALS, EQUIPMENT AND SYSTEMS

## 1. SCOPE

1.1 Scope.— This specification sets forth Naval Ship Systems Command requirements for manuals necessary for installation, operation, maintenance, and repair (without the services of manufacturer's representatives) of equipment and systems.

1.2 Classification.— Manuals shall be of the following types, as specified (see 6.1):

- Type I - Electrical and mechanical equipment manuals.
- Type II - Electronic and specialized equipment manuals.
- Type IIa - Experimental equipment manuals.
- Type III - Systems manuals.

## 2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein.

## SPECIFICATIONS

## MILITARY

- MIL-D-1000/2 - Drawings, Engineering and Associated Lists.
- MIL-D-5480 - Data, Engineering and Technical: Reproduction requirements for.
- MIL-Q-9858 - Quality Program Requirements
- MIL-M-9868/1 - Microfilming of Engineering Documents, 35MM, for Naval Ship Systems
- MIL-B-21741 - Book, Technical, Maintenance Standards

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## STANDARDS

## MILITARY

- MIL-STD-12 - Abbreviations for Use on Drawings and in Technical-Type Publications.
- MIL-STD-15-2 - Electrical Wiring Equipment Symbols for Ships' Plans, Part 2.
- MIL-STD-15-3 - Electrical Wiring Symbols for Architectural and Electrical Layout Drawings, Part 3.
- MIL-STD-17-1 - Mechanical Symbols (Other than Aeronautical, Aerospacecraft and Spacecraft Use), Part 1.
- MIL-STD-17-2 - Mechanical Symbols for Aeronautical, Aerospacecraft and Spacecraft Use, Part 2.

## HANDBOOKS

## MILITARY

- H4-1 - Cataloging Handbook, Federal Supply Code for Manufacturers, United States and Canada, Name to Code.
- H4-2 - Cataloging Handbook, Federal Supply Code for Manufacturers, United States and Canada, Code to Name.

## PUBLICATIONS

## DEPARTMENT OF DEFENSE

- DOD5220.22-M - Industrial Security Manual for Safeguarding Classified Information.

## NAVAL SHIP SYSTEMS COMMAND

- NAVSHIPS 94500 - Preparation Guide for Electronic Equipment Technical Manuals.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications.-- The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.



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## UNITED STATES OF AMERICA STANDARDS INSTITUTE (USAS)

PH 1.25 - Specifications for Safety Photographic Film.

Y14.15 - Electrical Diagrams.

Y32.2 - Electrical and Electronics Diagrams, Graphic Symbols for.

Y32.14 - Logic Diagrams, Graphic Symbols for.

Y32.16 - Electrical and Electronics Reference Designations.

(Applications for copies should be addressed to the United States of America Standards Institute, 10 East 40th Street, New York, N. Y. 10016.)

## UNIFORM CLASSIFICATION COMMITTEE

Uniform Freight Classification Rules.

(Applications for copies should be addressed to the Uniform Classification Committee, 202 Union Station, 516 West Jackson Boulevard, Chicago, Illinois 60606.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

## 3. REQUIREMENTS

3.1 Level of writing.- As a general guide, the level of writing should be that for a high school graduate having specialized training as a technician through Navy training courses. Operating instructions shall be written to the level of an operator having previous experience in the operation of similar or related equipment. The level of writing for other portions of the manual shall be to that of a technician having previous maintenance experience with similar or related equipment. These manuals are required to be written to the level of understanding of a Navy Technician Third Class. Technical manuals for experimental equipment (type IIa) should be written to the level of understanding of an engineer.

3.2 References.- When reference to other documents is required, it shall be treated as follows:

- (a) When a small amount of information is needed, the applicable material may be extracted and condensed.
- (b) A large amount of material shall be referenced fully, including the title of the publication; the publication identifying number; and reference to volume, part, chapter, section, figure, table, and paragraph.

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- (c) When the reference is to an entire content of another document, the reference shall be only to the title of the publication and the publication identifying number.

3.3 Contents.— Manuals shall contain the following data, as applicable, arranged in an appropriate order to provide adequate instruction for installation, operation, and maintenance of the equipment or system:

Front matter  
General information  
Installation  
Operation  
Trouble shooting  
Maintenance  
Parts list  
Index

3.3.1 Front matter.— Standard front matter, listed in the normal sequence of appearance, shall consist of the items specified in 3.3.1.1 through 3.3.1.8.

3.3.1.1 Cover and title page.— The cover shall contain the information shown on figure 1. The title page shall contain the information shown on figure 2.

3.3.1.2 Approval and procurement record page.— For type I manuals only, the approval and procurement record (APR) page shall follow the title page, and shall conform to figure 3.

3.3.1.3 Content assurance pages.— The content assurance pages shall follow the title page or approval and procurement record page and shall conform to figures 4 and 5. In multi-volume manuals, these pages shall be included in each volume for the content in that volume. Figures 4 and 5 shall be used as reproduction copy for the production of these sheets.

3.3.1.4 Limited rights page.— The limited rights page(s) when authorized by the terms of the contract, shall follow the title page and conform to figure 6. In multi-volume manuals, this page shall be included in each volume as required. Revisions or changes to existing publications subject to limited rights shall include a limited rights page as required and shall revise or identify those portions of the revision or change containing limited rights and shall also reflect any differences existing at that time. If the existing publication does not contain a limited rights page and should have contained one then the revision or change shall correct this deficiency.

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3.3.1.5 List of effective pages.-- A list of effective pages shall be included on the back of the title page in each separately bound volume and shall list all pages of the volume and shall indicate the issue information of each page.

3.3.1.6 Table of contents.-- The table of contents shall list all primary divisions (chapters, sections, and paragraphs), with their corresponding page numbers. In multi-volume manuals, volume 1 shall contain a complete table of contents for all volumes; each subsequent volume shall contain its own table of contents.

3.3.1.7 List of illustrations.-- The list of illustrations shall contain a complete listing of figures, titles, and page numbers. In multi-volume manuals, volume 1 shall contain a complete list of illustrations; each subsequent volume shall contain its own list of illustrations.

3.3.1.8 List of tables.-- The list of tables shall contain a complete listing of all tables, titles, and page numbers. In multi-volume manuals, volume 1 shall contain a complete list of tables; each subsequent volume shall contain its own list of tables.

3.3.2 General information.-- The manual shall include an overall description of the functions and purpose of the equipment. This information is intended for use at the command level and others requiring a general summary of the equipment or system and its performance, advantages and limitations. It should not include information on operation and maintenance.

3.3.2.1 Description.-- The functioning of the equipment or system as a whole and of its interrelated units shall be described. The functional description shall be nontechnical in nature and shall describe the intended use (why, where, when, and with what), capabilities, and limitations of the equipment or system. Text covering physical descriptions or structural arrangements shall be brief, with special attention given to avoiding the inclusion of unnecessary or repetitious details that are easily illustrated. If the manual covers more than one model equipment or system, a statement or table pointing out the differences shall be provided. A list of equipment supplied, together with the approximate volume, weight, and over-all dimensions of each unit, if applicable, shall also be included. A list of equipment or publications required but not supplied and a compilation of quick reference data shall also be included. The quick reference data shall consist of pertinent technical or design characteristics of the equipment. Examples of such data are:

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- (a) Descriptive (nameplate) data necessary to identify manufacturer, type, and model.
- (b) Functional characteristics, such as:
  - Power requirement.
  - Types of operation.
  - Power output.
  - Frequency.
  - Pulse characteristics.
  - Sensitivity; selectivity.
- (c) Capabilities, such as:
  - Rated ranges.
  - Coverage.
  - Resolution.
  - Accuracy.
- (d) Rated outputs, such as:
  - Wattages.
  - Voltages.
  - Horsepower.
  - Gallons per minute.
- (e) Special characteristics, such as:
  - Operating temperatures.
  - Heat dissipation per unit.
  - Pressure.
  - Humidity.
  - Tolerances.
- (f) Other pertinent characteristics.

3.3.3 Installation.-- Installation information, as necessary to summarize installation drawings (conforming to MIL-D-1000/2), such as: site selection unpacking and handling (where abnormal procedures or precautions are required), preparation of foundations, power requirements, mechanical assembly procedures, mounting instructions, bolting diagrams, safety precautions or guards, grounding and bonding, clearances for access, ventilation, motion under shock, methods of testing to assure satisfactory installation, alignment precautions, and other recommendations for reduction of electrical or electromagnetic interference shall be provided. Information shall also be included to describe and illustrate, as necessary, the procedures to prepare the equipment for reshipment, taking into account complicated disassembly or dismantling procedures and known requirements for special handling of the equipment.

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3.3.3.1 Unit interconnection diagrams.- These diagrams are to contain all the information necessary to make the electrical connections between units of the equipment, and to the primary power source. Sufficient data is to be contained on the diagrams to enable circuits to be traced between units. Indicate which cables (if any) are contractor furnished. In addition, show connections to fire control or other related equipment.

3.3.4 Operation.- Operating instructions shall include routine and emergency procedures (manual, automatic, local, and remote), safety precautions, and quantitative and qualitative limits to be observed in the starting, operating, stopping, or shutting down of the equipment or systems. Where operating procedures or adjustments are to be performed in a specific sequence, step-by-step procedures shall be given; tables or charts, as necessary, are preferred for the presentation of such procedures. Adequate illustrative material shall supplement the text, to identify and locate all operating control and indicating devices. Tables which present the function of each operating control and indicating device, as well as the normal in-use position or indication, shall be included. Operating and stand-by cycling time for maximum overall equipment life shall also be included. Emergency operating instructions shall describe procedures to be followed when normal operation is not possible because of emergency conditions, such as: power failure, "battle short" operation, control air failure, lube-oil failure, partial failure of equipment, and so forth. All operating instructions and procedures shall be included unless otherwise specified in the contract.

3.3.4.1 Operator's maintenance.- It is the intent of this specification that the operator's information include any maintenance procedures within the capability of an operator. This capability is limited to procedures governing periodic inspection, cleaning, servicing, preservation, lubrication, adjustment, and minor parts replacement (fuses, dry batteries indicator lamps, and so forth) which do not require internal alignment or complex adjustment.

3.3.5 Trouble shooting.- The manual shall provide the maintenance technician with adequate details for quickly and efficiently locating the cause of an equipment malfunction. The discussions shall contain concise information (to the extent needed) on how the equipment operates. The discussions shall be in order of operational or data sequence, as applicable. Block diagrams, simplified schematic diagrams of electrical, mechanical, hydraulic, pneumatic, and electronic circuits or systems, performance curves, and nomographs shall be used to support the discussions wherever necessary. Trouble-shooting information required to localize any trouble to a particular functional division (or unit) shall be included, to serve as a guide in isolating faults.



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3.3.6 Additional specific requirements for types I, II, and III manuals are set forth in 3.4, 3.5 and 3.6, respectively.

3.3.7 Parts list.-- The parts list shall include identification data covering all maintenance parts, to facilitate ready identification of the parts for replacement and ordering purposes. Standard hardware, structural parts, or other parts which have no maintenance significance shall not be listed. A brief introduction and the applicable tables listed in 3.3.7.1 through 3.3.7.3 shall be included.

3.3.7.1 List of units.-- The units shall be listed by unit number in numerical order; the list shall also indicate the quantity per equipment and the official name and designation.

3.3.7.2 Maintenance parts list.-- The maintenance parts list shall list all of the units and their maintenance parts. The listing shall be arranged by units in numerical sequence. Maintenance parts for each unit shall be listed alphabetically-numerically by class of item, except that all attached items of a unit or subassembly shall precede its removable parts and subassemblies, following the unit reference designation:

- (a) The tabulation shall consist of the following data: reference designation (military or commercial, as applicable) and the name and description of the parts, keyed to an illustration. (If a cross reference list to provide parts location data is included with the repair material, the parts list can omit cross reference to an illustration.) Those parts which are not covered by military designation shall include sufficient characteristics to allow identification of the part within the equipment.
- (b) A separate list of any special tools supplied with the equipment shall be provided at the end of the parts list tabulation.

3.3.7.3 List of manufacturers.-- A list of manufacturers shall be supplied unless the manufacturers are identified within the parts list tabulation by name and not by code. The list shall be prepared code to name in numerical sequence and shall be in accordance with Handbooks H4-1 and H4-2.

3.3.8 Index.-- An alphabetical index by subject shall be included if the manual contains more than 100 pages. In multi-volume manuals, the index shall be included in volume 1 only.



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3.3.9 User activity comment sheet.- The manual production source shall include in each bound copy of final equipment and systems manuals one user activity comment sheet. This sheet shall be located immediately following the last page of each manual. In multi-volume manuals the sheet shall be located immediately following the last page of each volume. The form in this specification (see figure 7) shall be used as reproduction copy for the production of these sheets.

3.4 Specific requirements for type I manuals.-

3.4.1 Maintenance and repair.-

3.4.1.1 Preventive maintenance.- Instructions shall include all maintenance procedures, examinations, tests, and adjustments which should be performed periodically under shipboard conditions for the purpose of preventing failure or impairment of the equipment. A one-page summary and time schedule for maintenance procedures, including a check-off table where appropriate, shall be provided. The summary sheet shall identify any items required by the Navy, as indicated at time of approval action, to be included in the ship's permanent history cards. Where necessary, instructions shall include procedures for obtaining access to the subcomponents for maintenance. Maintenance instructions shall include, where appropriate, but shall not be limited to the following:

- (a) A tabulation of periodic, routine, mechanical, and electrical tests and checks which should be accomplished regularly to show that subcomponents are operating properly and to insure continuity of service at optimum performance.
- (b) Table or charts, including "wear-limit" charts when appropriate, to indicate what is to be done, when it is to be done based on inspection, and how to do it.
- (c) Utilization of the test facilities which may be incorporated in the various components.
- (d) Instructions for the care, inspection, and cleaning of all pertinent parts.
- (e) Instructions stressing the importance of properly maintaining all safety devices and interlocks provided to prevent damage to equipment or injury to personnel.
- (f) Instructions on lubrication at shipboard operating temperatures shall be provided as applicable, preferably in chart form. They shall include information regarding lubrication recommended by the manufacturer and the type of lubricant to be

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to be used. Lubricants shall be described by symbol number, Federal stock number and military or commercial standard numbers, as applicable.

- (g) Instructions on in-place balancing or other means of reducing noise level if equipment specifications and shipboard application require quiet operation.

3.4.1.2 Trouble shooting, overhaul, and repair.— Instructions shall include all information necessary to locate trouble, and to make repairs, adjustments and conduct tests of each component, assembly or subassembly of the equipment. The following shall be included:

- (a) Trouble shooting guides for the localization of faults giving possible sources of trouble, the symptoms, probable cause, and instructions for remedying the faults.
- (b) Complete instructions on signal tracing for electric circuits, use of special test instruments and unusual servicing techniques.
- (c) Ample figures and sectional views giving details of mechanical assemblies, and simplified schematic diagrams of electrical, mechanical, hydraulic and pneumatic circuits. Figures contained elsewhere in the manual may be used and referred to under this heading without duplicating them.

3.5 Specific requirements for type II manuals.—

3.5.1 Preparation guide.— NAVSHIPS 94500 provides detailed examples of organizing, illustrating, and expressing technical material required by this specification. Any deviation from this guide shall be approved by the command or agency concerned.

3.5.2 Trouble shooting.—

3.5.2.1 Trouble-shooting guides for localizing faults, giving sources of trouble, the symptoms, and probable cause, and instructions for remedying the faults shall be included for equipment or systems if adequate historical data is readily available.

3.5.2.2 Trouble shooting where adequate historical data is not readily available shall be based on the following "logical trouble-shooting procedure" (see 6.2):

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- (a) Step 1 - Symptom recognition.- The technician must be able to recognize when the equipment is malfunctioning or when performance has deteriorated beyond acceptable limits. This requires that the technician have available data similar to the following:
- (1) Expected performance or design characteristics for the equipment as a whole.
  - (2) Performance limits for individual units of an equipment.
  - (3) Other factors which can cause a deterioration in equipment performance but are not the direct result of an equipment malfunction.
- (b) Step 2 - Symptom elaboration.- After a trouble has been verified, the technician must use the available aids designed into the equipment to further define the trouble. As an aid to this step, the technician needs:
- (1) A list of all front panel indicating devices (listing normal indications) and the controls which govern their operation.
  - (2) A list of all critical adjustments or alignment procedures which affect equipment operation.
  - (3) Programmed or automatic testing procedures.
- (c) Step 3 - Listing probable faulty function.- After the technician has further defined the equipment trouble, he makes several "logical choices" covering the general location of the trouble, based upon the symptoms, his knowledge of the equipment, and the information available in the manual. In making these "logical choices", the technician will limit the location of the fault to those functional divisions which, if defective, could reasonably cause the trouble. For this he needs:
- (1) A complete functional description of the equipment, and a detailed description of the operation of each functional division of the equipment and an explanation of critical circuits and reasons for adjustments.
  - (2) Block diagrams of the equipment broken down into its functional divisions.
- (d) Step 4 - Localizing the faulty function.- After "Choosing" the functional division that could be faulty, the technician performs certain tests or checks which will either eliminate or pinpoint the functional division under consideration. In order to perform these tests, the technician needs:
- (1) A list of test equipment and any special tools required.
  - (2) A complete and comprehensive servicing block diagram for each functional division of the equipment.

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- (3) Illustrations calling out significant test-point locations.
- (e) Step 5 - Localizing trouble to the assembly (or circuit).-  
After the faulty functional division has been isolated, further "logical choices", together with additional tests and checks, enable the technician to isolate and pinpoint the part(s) causing the trouble. In order to accomplish this degree of isolation, the technician needs:
  - (1) An overall equipment schematic diagram, or, if the equipment is large or complex, individual unit schematics.
  - (2) A listing of pertinent measurements (end play, backlash, clearances, temperatures, resistances, waveforms, and so forth) to be used as they apply in checking individual assembly or circuit conditions.
  - (3) Illustrations showing the location of all parts.
- (f) Step 6 - Failure analysis.- This is simply a review step in which the technician retraces the procedures he used in arriving at the corrective measure he is about to take. It allows the technician to broaden his background by giving him practice in determining the effect of the faulty part on the functional division, and on the equipment.

### 3.5.3 Maintenance.-

3.5.3.1 Preventive maintenance.- All preventive maintenance procedures, tests, examinations, and adjustments which should be performed periodically to maintain proper operation shall be included if they are not described in a separate maintenance publication (such as Maintenance Standards Books as covered by MIL-B-21741). The instructions shall include, where appropriate:

- (a) A maintenance procedures summary and time schedule chart.
- (b) A tabulation of periodic performance, mechanical and electrical tests and checks, cleaning and inspections, and lubrication. Each of the checks or procedures shall be properly illustrated, and a regular time interval of performance shall be established (such as daily, weekly, monthly, and so forth). Acceptable limits of performance shall also be included within the tabulations. In general, the information shall indicate when it is to be done, what is to be done, how to do it, and the expected result.
- (c) Lubrication instructions shall include manufacturer's recommendations on types of lubricant to use, specific time intervals for lubrication, and, where necessary, and special instructions covering

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- lubricating procedures. Lubricants shall be identified by military or commercial standard numbers, as applicable.
- (d) Cleaning instructions shall include information on the types of solvents to use and the cleaning periods. The cleaning solvents shall be identified by military or commercial standard numbers, as applicable:

3.5.3.2 Repair.-- Instructions shall be provided for the removal, repair, adjustment, and replacement of all items which are within the ability of a technician to perform. Schematic diagrams of electrical, mechanical, hydraulic, pneumatic, and electronic circuits; parts location illustrations or other methods of parts location information; photographs, interconnection cabling, piping plans, intrarack wiring data (diagrams or tabular listings), and exploded and sectional views giving details of mechanical assemblies shall be provided as necessary, to supplement the test. For mechanical items, information on tolerances, clearances, wear limits, maximum bolt-down torques, and in-place balancing or other means of reducing noise level shall be supplied. Information on the use of special tools and test equipment supplied with the equipment, as well as any cautions or warnings which must be observed to protect personnel and equipment, shall also be covered. The presentation should be arranged on a unit-by-unit basis; however extensive material, procedures, or illustrations which are common to more than one assembly or subassembly need not be repeated, but may be referenced.

3.5.4 Operators' handbook.-- When the thickness of the manual exceeds approximately 1 inch, the operators' information required in 3.3.4 shall be bound as a separate "Operators' Handbook". When bound separately, the standard front matter specified in 3.3.1 shall be included in the handbook.

3.5.5 Type IIa manuals.-- Type IIa manuals, covering experimental equipment, shall contain the data elements required for type II manuals, except as specified in 3.1 and 3.8.9.

3.6 Specific requirements for type III manuals.-- Systems manuals shall contain data required for type I manuals, for electrical and mechanical equipments, or type II manuals for electronic equipment, arranged in an appropriate order to provide system oriented instructions for overall operation, checkout, and maintenance of the system. Detailed requirements for these manuals shall be as specified in the contract, order, or ship specification.

Parts lists of units involved with systems not already covered in equipment manuals shall be included.

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### 3.7 Format.--

3.7.1 Volumes.-- When the thickness of a manual exceeds approximately 2 inches, the manual shall be divided functionally into volumes and chapters or sections, as necessary, to provide easy handling and to present orderly instructions.

3.7.2 Text.-- The text shall be specific, concise, and clearly worded to be readily understandable by personnel involved in the operation, maintenance, and repair of the equipment.

3.7.3 Emphasis.-- The Naval Ship Systems Command is mainly interested in the adequacy and completeness of contents and the clarity and readability of the information rather than the format. The manual shall be oriented toward operation, maintenance, and repair of the equipment by the forces afloat, without the services of a manufacturer's representative. The portions devoted to descriptive matter and theory shall be limited to those which are essential to a proper understanding of the equipment for satisfactory operation, maintenance and repair. The text need not duplicate information which is adequately shown on the photographs, drawings and illustrations incorporated in the manual.

3.7.4 Security classification.-- The Security Requirements Check List (DD Form 254) which constitutes a part of the contract for all classified material, identifies and indicates the classified features. Classified material shall be handled in accordance with the Industrial Security Manual for Safeguarding Classified Information (DOD 5220.22-M). Whenever possible, the title and installation, operation, and parts list information shall be kept unclassified.

3.7.5 Notes, cautions, and warnings.-- Notes, cautions, and warnings shall be used to emphasize important and critical instructions, consistent with the need. Notes, cautions, and warnings shall immediately precede the applicable instructions, and shall be selected in accordance with the following:

- (a) "NOTE" - Concerns an operating procedure or condition which should be highlighted.
- (b) "CAUTION" - Concerns an operating procedure or practice, which if not strictly observed, will result in damage to or destruction of equipment.
- (c) "WARNING" - Concerns an operating procedure or practice which, if not strictly observed, will result in injury to personnel or loss of life.

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3.7.6 Numbering and identification.- Any chapter, section, page, and paragraph numbering system is acceptable if it facilitates adequate indexing and location of information.

3.7.7 Illustrations.- Illustrations perform the function of graphically presenting required information. They shall be so planned and laid out as to portray complete pertinent information in a clear and accurate manner. Contractors may use available illustrations (photographs, diagrams, and so forth) prepared for other publications if the illustrations conform to this specification.

3.7.8 Abbreviations.- Abbreviations for use on drawings shall conform to MIL-STD-12.

3.7.9 Graphic symbols.- Graphic symbols shall be as specified in the following documents:

- (a) USAS Y32.2 for electrical and electronic diagrams.
- (b) USAS Y32.14 for logic diagram symbols (distinctive shapes only).
- (c) MIL-STD-15-2 for electrical wiring equipment symbols (for ships drawings only).
- (d) MIL-STD-15-3 for electrical wiring symbols for architectural and electrical layout drawings.
- (e) MIL-STD-17-1 and MIL-STD-17-2 for mechanical symbols.

For required details on the application of graphic symbols refer to USAS Y14.15.

3.7.10 Reference designations.- Electrical and electronics reference designations shall conform to USAS Y32.16.

3.7.11 Distribution statements (see 6.1 and 6.3).- The applicable distribution statement shall be included on the title page.

3.7.12 Engineering drawings.- Engineering drawings prepared in accordance with MIL-D-1000/2, are acceptable as illustrations if the copy meets the legibility requirements of MIL-D-5480 when reduced to technical manual size.

### 3.8 Production.-

3.8.1 Detail materials, reproduction procedures, and assembly shall be approved at time of submission of manuscript for approval. Acceptable



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production details are set forth in this specification. Alternate methods will be approved if equivalent performance and durability are provided.

3.8.2 Use of color.- Color shall only be used to clarify functional operations. Such methods as cross-hatching or shading shall be used in lieu of color when there will be no loss in comprehension. Color shall not be used for backgrounds or for other decorative purposes. If color is used a legend shall be included to explain the colors used. Colors shall be held to a minimum.

3.8.3 Typography.- It is not the intent of this specification to state the different methods or composing equipment to be used, but rather to state the results required. All manuals shall meet the requirements for good reproduction by 35MM microfilming. Letters, lines, and symbols shall be of a uniform contrast throughout the publication. Blurred or smudged printing or drop-out of characters or lines shall be cause for rejection. Characters shall be no smaller than 8-point type. When revisions are made, the typography shall conform as nearly as possible to the original manual. Preferred typography is set forth in table I.

- (a) Table I indicates the final point size of the type. When oversize pages are used for composition, the type shall approximate these sizes when reduced.
- (b) The type families listed below are most preferred, and can be closely matched by cold composition processes:

Book face (Roman)

|          |              |
|----------|--------------|
| Garamond | Bookman      |
| Century  | Modern Roman |
| Modern   | Baskerville  |

- (c) Leading and spacing may be relaxed where circumstances require such alterations.

Table I - Typography.

| Use                     | Type face and point size        | Capitalization | Leading | Spacing between lines |
|-------------------------|---------------------------------|----------------|---------|-----------------------|
| Security classification | Same type family as text, 14 pt | Capitals       | 6 pt    |                       |

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Table I - Typography. (continued)

| Use                        | Type face and point size                 | Capitalization          | Leading | Spacing between lines   |
|----------------------------|--|-------------------------|---------|---|
| Body text                  | Book face (roman), 10 pt                 | Capitals and lower case | 1 pt    | 12 pt preceding illustration or following figure title.                 |
| Chapter and section titles | Same as body text                        | Capitals                | 6 pt    | 48 pt following marginal copy, text, or illustration                    |
| Primary side heads         | Same as body text                        | Capitals                | 2 pt    | 6 pt preceding or following text  |
| Subordinate side heads     | Same as body text                        | Capitals                | 1 pt    | 6 pt preceding or following text  |
| Marginal copy              | Same as body text                        | Capitals and lower case | Solid   |   |
| Tables:<br>Titles          | Same as body text                        | Capitals                | 2 pt    | 6 pt to preceding text and following rule                               |
| Column heads               | Same as body text                        | Capitals                |         |   |
| Body                       | Same as body text                        | Capitals and lower case | 1 pt    | 6 pt preceding bottom rule or following headings                        |
| Parts listing              | Book face (roman) 8 pt, or EAM print-out | Capitals and lower case | 1 pt    | 6 pt preceding bottom rule or following headings                        |
| Note (word only)           | Same as body text                        | Capitals and lower case |         | 4 pt preceding and following text (text of Note set same as body text). |

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Table I - Typography. (continued)

| Use                 | Type face and point size | Capital-ization         | Leading | Spacing between lines                                 |
|---------------------|--------------------------|-------------------------|---------|---|
| Caution (word only) | Same as body text        | Capitals                |         | Same as for Notes                                     |
| Warning (word only) | Same as body text        | Capitals                |         | Same as for Notes                                     |
| Figure titles       | Same as body text        | Capitals and lower case | 2 pt    | 6 pt following illustration                           |
| Keys or legends     | Same as body text        | Capitals and lower case | 1 pt    | 6 pt following figure title or following illustration |
| Footnotes           | Same as body text        | Capitals and lower case | 1 pt    | Fit to space available                                |

3.8.4 Layout.-- Recommended page layout is set forth below:

(a) Single pages.-- The layout is as shown in table II.

Table II - Single page layout.

| Page size<br>(Trim size<br>in inches) | Columns | Column<br>width<br>(picas) | Gutter<br>width<br>(picas) | Binding<br>edge<br>(picas) | Image*<br>depth<br>(picas) |
|---------------------------------------|---------|----------------------------|----------------------------|----------------------------|----------------------------|
| 8-1/4 x 10-3/4                        | 1**     | 42                         | ---                        | 7                          | 60                         |
| 7-3/4 x 10-1/4                        | 1       | 39                         | ---                        | 6                          | 57                         |
| 8-1/4 x 10-3/4                        | 2       | 20                         | 2                          | 7                          | 60                         |
| 7-3/4 x 10-1/4                        | 2       | 19                         | 1-1/2                      | 6-1/2                      | 57                         |
| 4-3/8 x 6-3/4                         | 1       | 20                         | ---                        | 5                          | 31-1/2                     |

\* Exclusive of security classification and page numbers.

\*\* Review manuscript only for type II manuals.

Blanks and spaces shall be avoided except on fold-ins. The first major division of the publication (chapter or section) shall begin on a new odd page.

(b) Fold-ins.--Fold-in pages shall be used only for diagrams, drawings, and charts which cannot be reduced for satisfactory presentation on a single page,

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or when frequent reference is required from other pages of the book. Page-size aprons are required. When fold-in pages are used, they should be held to a two-page fold-in whenever practicable, and shall not exceed an overall length of 34 inches from the binding edge, including the apron. The apron may contain information pertaining to the diagram, drawing or chart. Horizontal folds are not permitted.

3.8.5 Illustrations.-- Illustrations shall be prepared by the most economical method which will result in clear, legible illustrations.

- (a) Lettering.-- Lettering height in final reproduced form shall be not less than 0.060 inch.
- (b) Continuous-tone artwork.-- Continuous-tone artwork (photographs and renderings) shall provide a clear definition of shapes, tonal values, and surface texture. The subjects shall be well-lighted, detailed, and brilliant.
- (c) Line artwork.-- Line artwork shall be prepared with line weights of sufficient strength to reproduce sharply and clearly at the final reproduction size, and shall be suitable for reduction to 35mm microfilm in accordance with MIL-M-9868/1.

3.8.6 Paper stock.-- Paper stock for text pages and fold-ins shall be as follows:

- (a) Lithography.-- Paper stock shall be white offset book, free from unbleached or ground woodpulp, and shall have a substance weight of not less than 100 pounds per 1000 sheets, basis 25 by 38 inches.
- (b) Letterpress.-- Paper stock shall be equivalent to white super-calendered book, the content of which shall not exceed 5 percent unbleached chemical wood or ground woodpulp, the remainder to be bleached chemical woodpulp, and shall have a substance weight of not less than 90 pounds per 1000 sheets, basis 25 by 38 inches.

3.8.7 Cover stock.-- Cover stock shall be of plastic or pressboard. Information to be imprinted on the covers shall not be stamped in gold or any other metal foil. Cover colors for unclassified manuals shall be of any color except green, yellow, or pink. Covers for CONFIDENTIAL manuals shall be green. Covers for SECRET manuals shall be yellow. Covers for TOP SECRET manuals shall be pink.

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3.8.8 Binding.-- Manuals shall be prepared in looseleaf form, to facilitate the insertion of replacement pages. Metal prong fasteners or corrosion-resistant posts and screws shall be used. For manuals containing less than 100 pages (50 sheets) split type metallic fasteners may also be used. All metal parts shall be corrosion-resisting material or shall be treated to resist corrosion. The manual pages shall be punched or drilled as follows:

| <u>Hole-type binders</u>   | 4-3/8 x 6-3/4 | 7-3/4 x 10-1/4<br>(8-1/4 x 10-3/4) |
|----------------------------|---------------|------------------------------------|
| Number of holes            | Two           | Three                              |
| Hole size                  | 1/4           | 1/4                                |
| Distance, center-to-center | 4-1/2         | 4-1/4                              |
| Distance to binding edge   | 5/16          | 7/16                               |

Multi-slot binders

|                                     | Twelve      | Eighteen<br>(Nineteen) |
|-------------------------------------|-------------|------------------------|
| Number of slots                     |             |                        |
| Slot size                           | 3/16 x 5/16 | 3/16 x 5/16            |
| Distance, center-to-center          | 9/16        | 9/16                   |
| Distance to binding edge after trim | 3/16        | 3/16                   |

Punching or drilling or revision pages shall be the same as for the original manuals. Fillers shall be used to build up binding edge to same thickness as right-hand edge of manuals.

3.8.9 Preliminary, experimental and service test manuals.--

3.8.9.1 Typography.-- Manuals shall be typewritten, single-spaced. The copy shall be such that clear, readable reproductions may be obtained. Any method of duplication which will provide the necessary quantity of black legible copies will be acceptable. When the method of duplication permits, the manual shall be reproduced on both sides of the paper.

3.8.9.2 Layout.-- Layout shall conform to the requirements for final manuals (see 3.8.4) except that horizontal and vertical folds are acceptable on fold-in pages.

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3.8.9.3 Illustrations.-- Illustrations for preliminary, experimental, and service test manuals shall be prepared by the most economical method which will result in clear, legible illustrations when reproduced.

3.8.9.4 Paper and cover stock.-- Any good-quality paper stock which is suitable for the intended method of reproduction will be satisfactory for text and fold-in pages. Cover stock satisfactory for the intended use is acceptable; however the color shall conform to the requirements for final manuals (see 3.8.7).

3.8.9.5 Binding.-- Binding shall conform to the requirements for final manuals (see 3.8.8). Covers need not include any printed matter (other than the security classification) if suitable cut-out windows are provided.

### 3.9 Applicability of manuals.--

3.9.1 Identical manuals.-- For type I manuals only, when a manual that is already available is applicable in its entirety to the equipment being procured, the applicability is to be extended to include the additional ships by the contractor issuing a new approval and procurement record page (see 3.3.1.2).

3.9.2 Modified manuals.-- When existing manuals are applicable to the equipment being procured except for minor differences, the contractor shall modify the manual to cover the differences by the issue of a change or revision, as applicable.

### 3.10 Changes and revisions.--

3.10.1 Changes.-- All changes are to be issued in the form of replacement pages. Change numbers and NAVSHIPS numbers for the change will be assigned by the command or agency concerned when the submitted review copy is returned to the contractor.

3.10.1.1 A change shall consist of detailed instructions and revised pages for revising the manual. If more than 25 percent of the total pages of the manual (or volume if the manual consists of more than one volume) is affected, the manual (or volume) shall be issued as a revision (see 3.10.3). If, as a result of an equipment change, a manual covers only modified items or material, a note shall be included in the first paragraph of the instruction sheet to the effect that maintenance support activities should not dispose of the superseded pages until it can be established that all of the equipment

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population has been modified. Other activities should update their publications when the modification has been accomplished. If an equipment change does not affect the entire equipment population, the change shall be prepared in such a manner that the manual will describe both the affected and the unaffected equipment.

3.10.1.2 Instructions.- A change shall include an instruction sheet, which provides instructions for inserting new and revised pages and disposing of superseded pages, and shall contain the following.

- (a) A new cover and binding fasteners (for each volume affected) if the change includes too many new pages to fit in the original cover.
- (b) A revised title page, including the original approval date of the publication and the approval date of the change. The NAVSHIPS number for the change is to be inserted below the change number and date. The publication number appearing in the upper left hand corner remains unchanged.
- (c) A revised list of effective pages. If the publication does not contain a list of effective pages, a list of effective pages shall be prepared.
- (d) Change symbols.-Changes to the text and tables shall be indicated by a vertical six point line in the margin extending close to the entire area of the material affected (outer margin for double column material, outer margin for single column material). Previous change symbols on a page shall be deleted when a page is subsequently changed. Changes to photographs, line drawings, diagrams and schematics shall be indicated by a printer's fist or fist note. Changes confined to the same general area shall be indicated only once on the illustration.
- (e) Revised pages of the limited rights data page, table of contents, list of illustrations, list of tables, index, and content assurance pages, when applicable.
- (f) If a publication consists of more than one volume, changes shall be prepared separately and shall be numbered consecutively for each affected volume of the publication beginning with Change 1.

3.10.1.3 Copy, serial, or register numbers.- Changes for non-registered publications shall not bear copy, serial, or register numbers.



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3.10.1.4 Issue information.- Changed pages shall include the number of the change of which they are a part. For example: If a page is revised in Change 3, "CHANGE 3" shall be substituted for the publication issue information (Change 1, and so forth) in lower binding-edge corner of the page. On unrevised sides of revised pages, the number of the change in which they were first issued (such as Change 1) shall be included, as applicable.

3.10.1.5 Production of changes.- Changes shall be produced in the same method as the manual.

3.10.2 Parts list revision.- Corrections or additions to parts list tables shall be made either by revised pages or by providing supplementary tables, provided that such tables do not exceed 25 percent of the size of the parts list. In subsequent revisions, the parts list tables shall be revised until they exceed 25 percent of the parts list. When more than 25 percent of the parts list is affected, the list shall be completely revised or corrected by a change (see 3.10.1.1). Supplementary tables shall appear at the front of the parts list tabulation. The style and format shall be equivalent to that of the basic parts list. The supplementary parts list shall have a note equivalent to the following included in the introduction:

"This parts list has been corrected by means of the following supplementary tables. For any given item, always refer first to the appropriate supplementary table, since it completely supersedes any corresponding listing in the basic table. If no information is shown for a given item, refer to the basic table for the required information."

3.10.2.1 The supplementary parts lists shall be entitled: "SUPPLEMENTARY PARTS LIST". If applicable, each table of the supplementary parts list shall be numbered the same as the basic parts list, followed by the letter "A". All supplementary parts lists for previous changes shall be incorporated in the new supplementary parts list.

3.10.3 Revision.- A revision is a second or subsequent edition of a manual or a volume of a manual which supersedes the preceding edition. A revision shall be supplied when the number of pages required to supply corrected and additional information for the manual is more than 25 percent of the total pages of the manual (or volume). This includes pages affected by the current change (including backup pages), plus pages affected by previous changes. When a revision is issued, the following supersedure notice shall be included on the title page: "This publication supersedes NAVSHIPS (number) date (day, month, year)."



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3.10.4 Responsibility for changes or revisions to final manuals.- The contractor shall be responsible for supplying revisions or changes for inaccuracies or omissions determined during usage or from contractor-generated design or production changes to the system or equipment until expiration of the contractor's responsibility for the last system or equipment delivered has elapsed.

3.10.5 Interim changes.- Information amending, correcting, or modifying preliminary, experimental, and service test manuals may be supplied as an interim change. An interim change shall be so identified and dated. An interim change shall contain the detailed instructions for revising the manual. The instructions shall include a statement that the interim change shall be inserted in the manual behind the front cover. Quantity and distribution shall be in accordance with 3.12.1.

3.11 Approval.- All publications prepared by or for the Naval Ship Systems Command shall be approved by the Command, its field activities, or its representatives.

3.11.1 The contractor shall request a publication number from the Government approving activity when the manuscript is submitted for approval. Each volume of multi-volume publications shall have individual publication numbers.

3.11.2 Preliminary manual approval.- When there is insufficient time to permit approval by the command or agency concerned and still provide final manuals with the first equipment delivered, a review copy of a preliminary manual shall be submitted to the cognizant Government inspector for approval. These preliminary manuals shall consist of a complete text of the instructions required for the type of manual to be furnished. They shall contain all figures (photographs, exploded views, and drawings) which will appear in the final manual, although they need not be in final form.

3.11.2.1 The review copy shall be submitted (prior to shipment of the first equipment) to the Government inspector simultaneously with four copies of the manual to the command or agency concerned. Publications numbers for preliminary manuals shall be requested from the approving activity.

- 3.11.2.2 A self-addressed (contractor) postal card containing information equivalent to the notice indicated below shall be attached to the title page of all preliminary manuals which accompany equipment.

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IMPORTANT NOTICE: This is a preliminary manual for (insert nomenclature of equipment), publication (insert number), supplied under contract (insert number). A copy of the FINAL manual will be forwarded when published. Return this card IMMEDIATELY, indicating ship or shore activity and mailing address.

When postal cards are received by the contractor after shipment of the bulk quantity of manuals has been completed, they shall be forwarded to the cognizant Government inspector with a request to forward the cards to the Naval Supply Depot, Philadelphia.

3.11.3 Revisions or changes.- Four copies of changes or revisions shall be submitted to the Government approving activity for approval and assignment of a publication number.

3.12 Quantity and distribution.- The quantity of manuals shall be as specified (see 6.1). The contractor shall be responsible for the distribution of all manuals procured on the contract or order. Unless otherwise specified two copies shall be shipped with each equipment. Bulk quantities shall be distributed at time of shipment of first equipment, except that when preliminary manuals are supplied in accordance with 3.11.3, quantity and distribution shall be as specified in 3.12.1, and the final manuals shall be distributed within 90 days after receipt of approval.

3.12.1 Preliminary manuals, revisions, or changes.- The quantity shall be two per equipment, and a bulk quantity up to the bulk required for final manuals but no less than 25 copies. The actual quantity to be supplied will depend upon the need at the time and the expected delay in production of final manuals. Distribution will be as directed. Distribution of bulk shall be not later than 30 days after the shipment of the first equipment.

3.12.2 Revisions or changes.- The quantity of revisions or changes shall be as specified in the contract, order, or ships specification. The distribution of such material shall be to all activities receiving the original manual and in the same quantity or as directed by the command or agency concerned.

3.12.3 Replenishment material.- One glossy, unscreened photographic print of each half-tone illustration used in manuals shall be furnished, along with two copies of the final manual. This material shall be forwarded as directed, with a covering letter advising that the material is for replenishment purposes.

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3.13 Photolithographic negatives.-- All film (negative or positive) must be dimensionally stable film with a transparent film base (cellulose acetate, triacetate, polystyrene, polyester, vinyl, etc.) conforming to USAS PH1.25. Film with a slight matte finish is acceptable.

3.14 Reproduction and use rights.-- Reproduction and use rights of the publication, which constitutes technical data, shall be as provided for in the contract or order. Revisions and changes constitute technical data and are included in the term "publication".

3.14.1 Technical data.-- Unless the contract or order otherwise provides and unless the publication is marked as provided for in the contract or order, or in the absence of such a provision as herein specified, the Government shall have unlimited rights to use, duplicate (reproduce), or disclose the publication in whole or in part and to have or permit others to do so. If the contract or order provides for limited rights and if the publication is subject to limited rights the publication shall contain a limited rights page (see 3.3.1.4).

3.14.2 Copyright.-- If the publication is copyrighted in whole or in part, it shall include the following statement adjacent to the copyright notice:

"The Government is granted a royalty-free, nonexclusive, and irrevocable license throughout the world for Government purposes to publish, translate, reproduce, deliver, perform, dispose of, and to authorize others so to do, any or all material covered by this copyright."

However, if the contract or order provides for a copyright license different from the foregoing, the statement shall be modified to reflect the different license. Further, no such statement is required if the contract or order does not provide for a copyright license to the Government.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.-- Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification, where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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4.2 Quality program requirements.— The supplier shall provide and maintain a written quality program. Acceptance of the program shall be obtained from the cognizant Government activity prior to implementation for assuring the comprehensive control and evaluation of all manuals and all materials and data in support of the manuals.

4.2.1 The quality program shall be in accordance with the following requirements of MIL-Q-9858:

- (a) Quality program management:
  - (1) Organization.
  - (2) Initial quality planning (see 6.5.1).
- (b) Facilities and standards:
  - (1) Drawings documentation and changes.
- (c) Control of purchases:
  - (1) Responsibility.
  - (2) Purchasing data.
- (d) Manufacturing control:
  - (1) Completed item examination and test.
- (e) Coordinated Government/Contractor actions:
  - (1) Government inspection at subcontractor or vendor facilities.

4.2.2 In addition to the requirements of 4.2.1, the following, as a minimum, shall form a part of the quality program:

- (a) Designation of authority, functions, and duties of those responsible for preparation, inspection, and validation of the manuals.
- (b) Development, maintenance, distribution, and implementation of methods and procedures to assure the requisite quality of the manual.
- (c) Coordination with equipment or system design and production activities to assure that the latest technical data and information, such as: Operating and maintenance procedures, drawings, illustrations, etc., are used in the preparation of the manual and that revisions to the manual are made concurrent with revisions to the equipment or system design.
- (d) Establishment of in-process inspection points and develop, maintain, distribute, and implement inspection criteria in order to determine adequacy and accuracy during the development stages of the manual (see 6.5.2).

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- (e) Performance of a formal, detailed review, prior to validation, to assure that all technical data and information presented in the manual(s) are adequate, accurate, current, and comply with the contract and this specification.
- (f) Development, maintenance, distribution and implementation of validation plans and procedures.
- (g) Validation of the manual content against the physical equipment or system to assure that the manual depicts adequately and accurately that equipment or system. The instructions and procedures shall be performed by personnel of the level for which the manual is written using equipment normally available at the installation site, ship, or otherwise (see 4.4 and 6.5.4).
- (h) Utilization of feedback information from all levels to eliminate recurring discrepancies or to improve the manual.

4.2.3 When 3.9.1 or 3.11.1 apply, the requirements of 4.2.2(e), (f), and (g) shall apply. If there is a Content Assurance page within the manual that indicates a complete validation, 4.2.2(f) and (g) shall not apply.

4.2.4 When 3.9.2, 3.10 or 3.11.2 apply, the requirements of Section 4 of this specification shall apply.

4.3 Quality program acceptance.— Acceptance of the supplier's quality program by the Government in no way relieves the supplier of the final responsibility to furnish supplies and services as specified herein.

4.3.1 Acceptance shall not preclude additions, refinements, or changes to the quality program where evidence indicates that the program is not or will not meet the requirements of the contract or this specification.

4.3.2 When additions, refinements, or changes to the program are determined necessary by the supplier, acceptance shall be obtained from the cognizant Government activity prior to implementation.

4.4 Content assurance pages (see 3.3.1.3 and figures 4 and 5).— These pages in their fully completed form, shall appear in each manual required from the supplier under the terms of the contract, including manuscripts.

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4.4.1 In separate correspondence, the supplier shall provide justification for all chapters, sections, and paragraphs not validated. Insufficient time or personnel is not considered as adequate justification.

4.5 Costing information.— The supplier shall maintain and make available to the Government the costs (actual or estimated) relating to planning for and performance of validation.

## 5. PREPARATION FOR DELIVERY

### 5.1 Packaging and packing.—

5.1.1 Individual and multi-volume manuals.— Individual copies and multi-volume manuals shall be packed to preclude the possibility of damage in transit. Multi-volume manuals shall be furnished as complete sets except for the manuals shipped for stock. Stock copies of identical volumes shall be packed and shipped in common container(s).

5.1.2 Manuals shipped with equipment.— When copies of the manual are packed with the equipment, they shall be packed within the shipping container holding the main unit of equipment. The shipping container shall be marked with the words, "Technical Manuals Inside". The manuals shall be so placed that they are readily accessible prior to removing the equipment, and shall not be placed within the vapor-proof barrier material used to enclose the equipment. Manuals accompanying equipment shall be packaged in a waterproof container. The invoice, packing list or bill of lading shall include the publication number of the manuals, and the quantity; it shall also indicate which container includes the manual.

5.1.3 Bulk shipment.— Manuals shipped in bulk shall not be individually wrapped. Containers shall comply with the Uniform Freight Classification Rules or other carrier regulations, as applicable to the mode of transportation.

5.2 Marking.— On bulk shipments, interior packages and exterior shipping containers shall be marked with the following information for each item enclosed, except for shipment of an individual copy or an individual copy or an individual set of manuals:

Box (number) of (number), (to be listed on multiple container shipments)  
 Publication number.  
 Quantity (in package).  
 Contract or order number.





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The words "FOR STOCK" shall be marked on the package or packages destined for stock. The publication numbers shall be indicated on the shipping documents. When a contract or order requires manuals, revisions, or changes having different publication numbers, the stock copies of each number shall be packaged as separate items. All bulk shipments shall be made in accordance with security requirements.

## 6. NOTES

### 6.1 Ordering data.-- Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type of manual required (see 1.2).
- (c) Applicable distribution statement (see 3.7.11 and 6.3).
- (d) Quantity of manuals (revision or APR pages, for type I) required (see 3.12).

6.2 The purpose of the detail requirements for the "logical trouble-shooting procedure" is to insure that the maintenance technician will have sufficient trouble-shooting information to enable him to efficiently locate equipment troubles, using the steps outlined. The objective of the method is to develop the technician's ability to decide what checks should be performed and where to make them. The information presented in the manual should not act as a "crutch" for the technician, but rather should serve as one of his most important maintenance tools.

6.3 Distribution statement.-- A statement used in marking a technical document to denote the conditions of its availability for distribution, release or disclosure. This statement will be provided by the approving activity (see 6.1).

6.4 Quality program.-- A comprehensive quality assurance program is the only acceptable parameter to assure adequate and accurate manuals or support data for an equipment or system. The mission of a ship and the welfare of personnel aboard are directly dependent upon the availability and useability of their manuals. Therefore, it is of paramount importance that a comprehensive quality assurance program for planning, development, production, inspection, review, and validation, be established and implemented.

### 6.5 Planning, inspections, and reviews.--

6.5.1 Planning for manuals to support an equipment or system must begin during the early design definition phase of the related equipment or system to assure the requisite quality of the manual.

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6.5.1.1 The validation plan must reflect the supplier's procedures and scope of validation effect. The plan must identify the baselines that will ensure timely delivery of technical manuals. The plan must take into consideration changes and revisions of the technical manuals until the expirations of the supplier's responsibility.

6.5.2 In-process inspections are conducted by the supplier during the process of manual preparation. Conducting these inspections, following through on correcting the discrepancies, and preventing discrepancy recurrence is considered necessary to assure that the end product is of the requisite quality.

6.5.3 In-process inspections conducted by the Government are held primarily to provide guidance to the supplier and to assure that manuals are being prepared in accordance with specification requirements. These inspections may be conducted at the supplier's facility or his supplier's facility at any time during the development of the manuals.

6.5.4 Validation is defined as the process by which the contractor assures the technical accuracy and adequacy of a manual. The contractor will be responsible for the technical accuracy and adequacy of all technical manuals furnished by the contractor. The demonstration by actual performance of instructions and procedures in each manual relating to operation, assembly, disassembly, maintenance, and trouble shooting may be performed by a contractor at the equipment or ship construction site. If performed by a subcontractor, this does not relieve the contractor of the responsibility for providing a correct and adequate manual to the government. Written information and drawings in each manual will be checked against actual equipment in accordance with the approved quality program (see 4.2) to insure that the information and drawings match the actual equipment in all details depicted on them.

6.5.4.1 The installation procedures described in each manual will be checked during installation. Accessibility to execute all operating, assembly, disassembly, and maintenance procedures will be checked in the ship after installation by the installing activity. All procedures in each manual must be demonstrated by actual performance except for items of this nature:

- (a) Destruction of material, such as disassembly of electronic components and removal of boiler tubes, is not required.
- (b) Boring, grinding, and other shaping repair procedures need not actually be executed.

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- (c) Checking for accessibility will not be construed to require actual removal of distilling plant tube nests, shafting, crankshafts, inner tubes from periscopes, or other parts where the adequacy of accessibility can be determined by measurement, observation, and reference to drawings.
- (d) Emergency or damage control operating procedures which would endanger material or personnel and all operating procedures which would entail excessive costs not encountered in the normal operation of the ship will not be required. Excessive costs will be construed to include the provision of aircraft, submarines, oilers, and other naval ships for test unless furnished by the government.

6.5.5 Verification is accomplished by the Government for the purpose of assuring that manuals are compatible with the hardware and are adequate for test, calibration, operation, trouble shooting, maintenance, and repair, and are in conformity with the content and production requirements of this specification and the contract.

6.5.5.1 Verification consists of performance of selected operating and maintenance procedures, such as: Check-out, trouble shooting, calibration, alignment, installation, and scheduled removal and replacement instructions and an inspection of the manuals as offered.

6.5.5.2 Verification of manuals may be simultaneously performed with validation in cases where:

- (a) Time and equipment or facility availability does not permit separate verification and
- (b) Procedures are relatively simple and the likelihood of errors is slight.

6.6 CHANGES FROM PREVIOUS ISSUE. THE EXTENT OF CHANGES (DELETIONS, ADDITIONS ETC.) PRECLUDE THE ANNOTATION OF THE INDIVIDUAL CHANGES FROM THE PREVIOUS ISSUE OF THIS DOCUMENT.

Preparing activity:  
Navy - Ships  
(Project TMSS-NOOL)

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|   |
|---|
| <div><div>SECURITY CLASSIFICATION</div><div>NAVSHIPS NUMBER</div><div>VOLUME (number)</div><div>TYPE OF PUBLICATION</div><div>FOR</div><div>NOMENCLATURE<br/>OF EQUIPMENT(U)</div><div>(Manuals Bearing Classified Restricted Data Only)</div><div>RESTRICTED DATA</div><div>"This document contains information affecting the national Atomic Energy Act of 1954. Its transmittal or the disclosure of its contents in any manner to an unauthorized person is prohibited."</div><div>(Other Classified Manuals)</div><div>"This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C. Sections 793 and 794, the transmission or the revelation of which in any manner to an unauthorized person is prohibited by law."</div><div>DEPARTMENT OF THE NAVY<br/>NAVAL SHIP SYSTEMS COMMAND</div><div>SECURITY CLASSIFICATION</div></div> |
|---|

Figure 1. Sample Cover

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|   |
|---|
| <div><div>SECURITY CLASSIFICATION</div><div>NAVSHIPS NUMBER</div><div>VOLUME (number)</div><div>TYPE OF PUBLICATION</div><div>FOR</div><div>NOMENCLATURE</div><div>OF EQUIPMENT(U)</div><div>Place applicable distribution statement here.</div><div><div>For classified manuals, place applicable automatic, time-phased downgrading and de-classification notice here.</div></div><div>Place supersedure notice here.</div><div>DEPARTMENT OF THE NAVY</div><div>NAVAL SHIP SYSTEMS COMMAND</div><div>SECURITY CLASSIFICATION</div><div>Approval Date (Day, Month, Year)</div><div>Change Number</div><div>Approval Date of Change (Day, Month, Year)</div><div>NAVSHIPS Number of the Change</div></div> |
|---|

Figure 2. Sample Title Page

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## APPROVAL AND PROCUREMENT RECORD PAGE

APPROVAL DATA FOR: NAVSHIPS \_\_\_\_\_

TITLE OF MANUAL: \_\_\_\_\_

APPROVAL AUTHORITY: \_\_\_\_\_

| CONTRACT NUMBER | SHIP APPLICABILITY | QUANTITY OF MANUALS | QUANTITY OF EQUIPMENT | BUILDING YARD |
|-----------------|--------------------|---------------------|-----------------------|---------------|
|                 |                    |                     |                       |               |

REMARKS: \_\_\_\_\_

DATE: \_\_\_\_\_

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MANUFACTURER'S SIGNATURE  
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Approval Authority shall include the applicable letters or correspondence granting approval in conformance with approval procedures.

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Figure 3. Approval and procurement record page

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Figure 4. Sample

Content Assurance Page, Validation

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Figure 6. Limited rights page

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Figure 7. Use activity comment sheet

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